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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the adhesive composition containing a styrene system block copolymer.

[0002]

[Description of the Prior Art]In recent years, hot melt adhesive needs neither drying time nor a dryer, but moreover can complete adhesion in a short time, and is widely used increasingly from excelling in respect of processability, productivity, etc. The pressure sensitive adhesive which sticks as a kind of adhesives using adhesiveness is known, and it is also called the binder. And the adhesive product which provided the layer of this pressure sensitive adhesive on substrates, such as tapes, such as paper, a textile, and a plastic, a film, or a sheet, is widely used for various uses as adhesive tape, an adhesion film, a pressure sensitive adhesive sheet, etc. Also in such a pressure sensitive adhesive, the pressure sensitive adhesive of the hot melt type which can carry out heat melting and can carry out coating to a substrate from excelling in respect of workability, productivity, etc. is used increasingly.

[0003]The thermoplastic polymer which will be fused if it heats is being used for each of hot melt adhesive and pressure sensitive adhesives of a hot melt type as base polymer. As such a thermoplastic polymer, styrene system block copolymers, such as a hydrogenation thing of the block copolymer of a polystyrene polybutadiene polystyrene type and a hydrogenation thing of the block copolymer of a polystyrene polyisoprene polystyrene type, are known.

[0004]

[Problem(s) to be Solved by the Invention]However, the adhesive composition (a pressure sensitive adhesive composition is included) which used the styrene system block copolymer as the base, ** since the viscosity at the time of melting is high, coating speed is slow and coating cannot be carried out to a substrate at ** low temperature in which processability and

productivity are inferior, the coating to material with low heat deflection temperature of a polyethylene film, the nonwoven fabric made from polyethylene, etc. is difficult -- etc. -- the problem is pointed out. This invention is an adhesive composition which is made in view of this problem and contains a styrene system block copolymer, and makes it a technical problem to provide the adhesive composition in which processability and productivity have been improved by reducing the viscosity at the time of melting.

[0005]

[Means for Solving the Problem]A random copolymer (b) in which the above-mentioned technical problem makes a subject a styrene system block copolymer (a), a vinyl aromatic compound, and isobutylene according to this invention It is solved by providing an adhesive composition containing [calling it a random copolymer (b) for short hereafter].

[0006]

[Embodiment of the Invention]The adhesive composition of this invention includes both constituents used for sticking using the constituent and adhesive power which are used for pasting up using what is called adhesive strength. Therefore, when only calling it "adhesives" or an "adhesive composition" on this application specifications, the adhesives (adhesive composition) of a broad sense including a pressure sensitive adhesive (pressure sensitive adhesive composition) are meant.

[0007]The styrene system block copolymer (a) used in this invention is a block copolymer which has a polymeric block which consists of an aromatic vinyl compound as a hard segment, and a publicly known thing can be especially used for it without restriction from the former. The block copolymer etc. which consist of the block copolymer which consists of an aromatic vinyl compound and conjugated diene or its hydrogenation thing, an aromatic vinyl compound, and isobutylene as a styrene system block copolymer (a), for example are mentioned. As a styrene system block copolymer (a), what denaturalized with the maleic acid anhydride etc. may be used, and what has functional groups, such as a hydroxyl group, a carboxyl group, an amino group, an epoxy group, and a sulfhydryl group, may be used into a molecule. One kind of thing may be used for a styrene system block copolymer (a), and it may use two or more sorts together.

[0008]In the above, styrene, alpha-methylstyrene, p-methylstyrene, vinylnaphthalene, p-chloromethyl styrene, etc. are mentioned as a vinyl aromatic compound, for example. One kind of thing may be used as a vinyl aromatic compound, and two or more sorts may be used together. As conjugated diene, isoprene, butadiene, etc. are mentioned, for example. One kind of thing may be used as conjugated diene, and two or more sorts may be used together.

[0009]As a vinyl aromatic compound which constitutes the random copolymer (b) used in this invention, styrene, alpha-methylstyrene, p-methylstyrene, vinylnaphthalene, p-chloromethyl styrene, etc. are mentioned, for example. One kind of thing may be used as a vinyl aromatic

compound, and two or more sorts may be used together.

[0010]If a random copolymer (b) is within the limits which does not spoil the meaning of this invention, For example, copolymerization of the monomers, such as 1-butene, 1-pentene, 1-hexene, butadiene, isoprene, the methyl vinyl ether, ethyl vinyl ether, isobutylvinyl ether, beta-pinene, and indene, may be carried out.

[0011]The content of the vinyl aromatic compound in a random copolymer (b) and isobutylene is 80 to 100% of the weight of a range more preferably 70 to 100% of the weight in the melt viscosity of an adhesive composition, and the viewpoint of adhesive strength to both acquired sum total. And the rate of a vinyl aromatic compound and isobutylene is usually within the limits of vinyl aromatic compound/isobutylene = 1 / 100 - 100/1 (weight ratio).

[0012]from a viewpoint of the melt viscosity of the adhesive composition obtained although the weight average molecular weight of a random copolymer (b) is not necessarily limited -- desirable -- 500-100,000 -- it is within the limits of 500-50,000 more preferably.

[0013]A random copolymer (b) can be manufactured by a publicly known cationic polymerization method by polymerizing other monomers (these are hereafter called a raw material monomer for short) by a cationic polymerization method a vinyl aromatic compound, isobutylene, and a request, for example. When polymerizing, the conditions according to what is usually adopted by a cationic polymerization method are employable. As for polymerization temperature, it is preferred that it is usually within the limits of -100 °C - 100 °C, and, as for polymerization time, it is preferred that it is usually within the limits of 0.01 to 200 hours. As for a polymerization, it is preferred to carry out under the inert gas atmosphere of argon, nitrogen, etc.

[0014]As a polymerization initiator, what is used in the cationic polymerization method from the former can be used according to the kind of raw material monomer, choosing it suitably, For example, proton acid, such as alcohols; hydrogen chloride, such as Lewis acid (i)s, such as boron trifluoride, aluminum trichloride, titanium tetrachloride, and a tin tetrachloride, methyl alcohol, ethyl alcohol, and acetic acid; the combination of proton produced compound (ii)s, such as water, etc. can be mentioned.

[0015]On the occasion of the polymerization of a raw material monomer, the solvent used by the usual cationic polymerization method can be chosen suitably, and can be used. As an usable solvent, halogenated hydrocarbon solvents, such as hydrocarbon solvent; methyl chlorides, such as hexane, cyclohexane, a methylcyclohexane, benzene, and toluene, and a methylene chloride, etc. are mentioned, for example. One kind of thing may be used for these solvents, and they may use two or more kinds together.

[0016]In this invention, the rate of a styrene system block copolymer (a) and a random copolymer (b), From the melt viscosity of the obtained adhesive composition, and a viewpoint of adhesive strength, it is preferred that it is styrene system block copolymer (a) / random

copolymer (b) = 100 / 1 - 1/100 (weight ratio), Styrene system block copolymer (a) / random copolymer (b) It is preferred that it is = 95 / 5 - 5/95 (weight ratio).

[0017]As for the adhesive composition of this invention, it is preferred to blend a tackifier, in order to adjust the adhesive strength of the constituent obtained in addition to an above-mentioned styrene system block copolymer (a) and random copolymer (b). As a tackifier, for example Rosin, gum rosin, tall oil rosin, Rosin system resin, such as hydrogenation rosin and mallein-ized rosin; Terpene phenol resin, The terpene resin which makes an alpha pinene, beta-pinene, limonene, etc. a subject, Terpene series resin, such as aromatic hydrocarbon denaturation terpene resin; phenol-system-resin; xylene resin, such as petroleum resin; coumarone-indene resin; styrene resin; alkylphenol resin of an aliphatic series system, an alicycle fellows system, and an aromatic system and rosin modified phenolic resin, etc. are mentioned. One kind of thing may be used for a tackifier, and it may use two or more sorts together.

[0018]Although what is necessary is just to determine the loadings of a tackifier suitably according to the kind of tackifier to be used, the use of the constituent obtained, etc., it is preferred that it is within the limits of 10 - 500 weight section to thing 100 weight section which totaled the styrene system block copolymer (a) and the random copolymer (b).

[0019]The adhesive composition of this invention can also blend process oil as a plasticizer. In this case, the amount of the process oil used is usually 500 or less weight sections to thing 100 weight section which totaled the styrene system block copolymer (a) and the random copolymer (b).

[0020]The adhesive composition of this invention is a range which does not spoil the meaning of an invention, Other polymers, such as liquid rubbers, such as EPR, ERDM, polybutene, polyisobutylene, liquefied polyisoprene, and liquid polybutadiene, a styrene butadiene rubber, and an ethylene-vinylacetate copolymer, may be contained.

[0021]The adhesive composition of this invention may contain fibrous filler *****, such as inorganic powder bulking agent; glass fibers, textiles for organic reinforcement, etc., such as calcium carbonate, titanium oxide, barium sulfate, iron oxide, talc, mica, clay, carbon black, silica, and alumina, if needed. The adhesive composition of this invention may contain an antioxidant, an ultraviolet ray absorbent, paints, a color, a brightening agent, fire retardant, a heat aging inhibitor, a foaming agent, etc. if needed.

[0022]The adhesive composition of this invention a styrene system block copolymer (a) and a random copolymer (b) if needed with ingredients, such as a tackifier, process oil, other polymers, and an additive agent. It can prepare by using mixing or the kneading apparatus of a kneader, an extrusion machine, a roll mill, a Banbury mixer, etc., and usually kneading in a 110-220 ** temperature requirement.

[0023]The adhesive composition of this invention can be made into suitable gestalten, such as

block like shape, a grain, the shape of a flake, a pellet type, rod form, film state, and a sheet shaped, corresponding to the use and a using form.

[0024]Since the adhesive composition of this invention is usually fused easily and mobility comes to be shown, Like conventional hot melt adhesive or the pressure sensitive adhesive of a hot melt type, various materials, For example, the film which consists of plastics, such as polyethylene and polypropylene, By carrying out coating to substrates which can use it for adhesion of a sheet or a tape, paper, wood, textiles, metal, leather, etc., and consist of an organic polymer, such as a film, a sheet or a tape, and a textile, It can also be used for manufacture of various adhesive products, such as an adhesion film, a pressure sensitive adhesive sheet, and adhesive tape.

[0025]The adhesive composition of this invention Various fields, for example, the seal of a small box or a corrugated fiberboard, package; of a label etc. -- bookbinding; -- manufacture [of a plywood]; -- woodwork; -- shoemaking; -- sewing. manufacture [of textiles, such as a binder of a nonwoven fabric,]; -- manufacture [of various sanitary goods, such as a disposable diaper,]; -- adhesive tape for package; -- film for electric insulation, and tape; -- adhesive tape for surface protections and pressure sensitive adhesive sheet; -- it is used for semiconductor wafer manufacture -- several kinds -- in an adhesion film; sealing material's etc. field. [of various articles] It can be used.

[0026]

[Example]Although an example explains this invention concretely below, this invention is not limited to this example. The quality assessment of the obtained adhesive composition was performed by the following method.

[0027]It measured by the 25 ** ball tuck method indicated to adhesive JIS Z-0237.

Adhesiveness (tuck nature) is so good that ball tuck No. is large.

[0028]A 180-degree friction test estimated according to adhesive strength JIS Z-1522. That is, the created adhesive tape was cut into 25 mm in width, and a size 100 mm in length, and it stuck on the 1-mm-thick stainless plate or the polyethylene sheet, it exfoliated in the 180-degree direction the speed for 30-cm/in 25 **, and adhesive strength was measured.

[0029]It evaluated according to holding power JIS Z-0237. Namely, cut the created adhesive tape into 25 mm in width, and a size 25 mm in length, and it is stuck on a 1-mm-thick stainless plate, After carrying out holding fixing so that the stainless plate which stuck this tape may become vertical, 1 kg of load was applied to the lower end center part of the tape, and time until it neglects and falls in a 40 ** temperature atmosphere was measured. Holding power (creep resistance) is so good that retention time is long.

[0030]It measured at 140 **, 160 **, and 180 ** using the melt viscosity Brookfield viscometer.

[0031]Reference example (manufacture of the random copolymer 1)

The mixture which uses an initiator and toluene as a solvent and consists titanium tetrachloride

and water of styrene 50 weight section and isobutylene 50 weight section is polymerized by a cationic polymerization method at 0 °C under a nitrogen air current for 6 hours, and it is a styrene isobutylene random copolymer. [Number average molecular weight (Mw):8400, molecular-weight-distribution (Mw/Mn):2.93, styrene content:50.4 % of the weight] It obtained (it is hereafter called the random copolymer 1 for short).

[0032]According to the combination shown in the Examples 1 and 2 and comparative example 1 table 1, each constituent was kneaded for 20 minutes at 200 °C among the melting mixing chamber, and the adhesive composition (pressure sensitivity) was obtained. The melt viscosity of the obtained adhesive composition was measured by the above-mentioned method. The coating machine was used on 100-micrometer-thick polyester film, a thickness of 25 micrometers was coated with the obtained adhesive composition at the temperature of 160 °C, adhesive tape was produced, and the various performances were evaluated in accordance with the above-mentioned method. A result is shown in Table 1.

[0033]

[Table 1]

表 1

	実施例 1	実施例 2	比較例 1
配合 (重量部)			
スチレン系ブロック共重合体 (注 1)	90	80	100
ランダム共重合体 1	10	20	
粘着付与樹脂 (注 2)	150	150	150
プロセスオイル (注 3)	50	50	50
酸化防止剤 (注 4)	1	1	1
粘着性 (ボールタック No.)	15	13	17
保持力 (落下時間 (分))	>240	>240	>240
接着力 (g/cm)			
対ステンレス	765	940	750
対ポリエチレン	790	885	810
溶融粘度 (Pa・S)			
140℃	35	20	45
160℃	13	9	15
180℃	6	4	7

注 1 : セプトン 2063 (商品名, (株) クラレ製; スチレンと
イソプレンからなるブロック共重合体の水素添加物)

注 2 : クリアロン P-105 (商品名, 安原油脂工業 (株) 社製;
水添テルペン樹脂)

注 3 : ダイアナプロセス PW-90 (商品名, 出光興産 (株) 社製)

注 4 : イルガノックス 1010 (商品名, チバガイギー製)

[0034]

[Effect of the Invention]According to this invention, melt viscosity is falling compared with the conventional adhesive composition which uses a styrene system block copolymer as a base, and the adhesive composition in which processability and productivity have been improved is

provided.

[Translation done.]